

# Cal/Ecotox

## Exposure Factors for Western Toad (*Bufo boreas*)\*

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Endpoint Type	Endpoint Value	Error	Range	Units	Sex	Life Stage	Location	Note	Reference
Body Weight - Mean	0.429	0.02 SE		g	NR		CA	a	1
Body Weight - Mean	40.2	5.62 SE	27.1 - 58.4	g	B	Adult	CO	b	2
Body Weight - Mean	92.9		52 - 115	g	F	Adult	UT	c	3
Body Weight - Mean	64.6		52 - 80	g	M	Adult	UT	d	3
Body Weight - Mean	2.5		1.2 - 4.6	g	NR	Juvenile	Santa Cruz; CA	e	4
Body Weight - Mean	22.5		1.3 - 69.1	g	NR	NR	Lab	f	5
Body Weight - Mean	0.01			g	NR	Tadpole	Lab	g	6
Body Weight - Mean	0.115			g	NR	Tadpole	Lab	h	6
Body Weight - Mean	0.02			g	NR	Tadpole	Lab	i	6
Body Weight - Mean	0.187			g	NR	Tadpole	Lab	j	6
Body Weight - Mean	0.117			g	NR	Tadpole	Lab	k	6
Body Weight - Mean	0.463			g	NR	Tadpole	Lab	l	6
Body Weight - Mean	0.458			g	NR	Tadpole	Lab	m	6
Body Weight - Mean	0.440			g	NR	Tadpole	Lab	n	6
Clutch or Litter Size	12,000			#	F	Adult	OR	o	7
				eggs/spawn					
Dietary Composition	Isopoda (31.23%); Diplopoda (0.66%); Arachnida (2.14%); Orthoptera (0.35%); Dermaptera (2.65%); Coleoptera (54.06%); Lepidoptera (2.67%); Diptera (0.04%); Hymenoptera (5.92%); Unknown insects (0.3%)			%	NR	Adult	Kern; CA	p	8
Dietary Composition	Coleoptera (23.3%); Diptera (0.4%); Hymenoptera (75.3%); Lepidoptera (0.6%); Orthoptera (0.4%); Arachnoids (3.0%) and Diplopoda (0.6%)			%	NR	NR	MT	q	9
Dietary Composition	Nematoda (3.0%); Gastropoda (3-21.2%); Arachnida (3.0-42.5%); Orthoptera (3.0%); Coleoptera (3.0-51.5%); Hemiptera (3.0%); Neuroptera (3.0%); Lepidoptera (12.1%); Diptera (3.0-24.2%); Hymenoptera (3.0-88.1%)			%	NR	NR	CO	r	10
Food Ingestion Rate	see citation				NR	Juvenile	Lab	s	4
Growth Rate	see citation				NR	Juvenile	Lab	t	4
Metabolic Rate	log SMR = -2.23 + 0.037(T)			cm <sup>3</sup> O <sub>2</sub> /g/hr	B	Adult	Lab	u	2
Metabolic Rate	log AMR = -1.13 + 0.067(T) - 0.0008(T) <sup>2</sup>			cm <sup>3</sup> O <sub>2</sub> /g/hr	B	Adult	Lab	v	2
Metabolic Rate	see citation				NR	Juvenile	Lab	w	4
Metabolic Rate	26.86		7.5 - 43.7	ul O <sub>2</sub> /g/hr		NR	Lab	x	11
Metabolic Rate	30.80		11.2 - 47.5	ul O <sub>2</sub> /g/hr		NR	Lab	y	11
Metabolic Rate	29.41		18.3 - 41.8	ul O <sub>2</sub> /g/hr		NR	Lab	z	11

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Endpoint Type	Endpoint Value	Error	Range	Units	Sex	Life Stage	Location	Note	Reference
Metabolic Rate	32.54		13.8 - 67.9	ul O <sub>2</sub> /g/hr	NR		Lab	aa	11
Metabolic Rate	71.2		45.1 98.4	ul O <sub>2</sub> /g/hr	NR		Lab	ab	11
Metabolic Rate	25.54		10.3 - 47.1	ul O <sub>2</sub> /g/hr	NR		Lab	ac	11
Metabolic Rate	Log VO <sub>2</sub> = 0.75(Log BW) - 2.43			cm <sup>3</sup> O <sub>2</sub> /min	NR	NR	Lab	ad	5
Metabolic Rate				cm <sup>3</sup> O <sub>2</sub> /min	NR	NR	Lab	ae	5
Metabolic Rate			76.34 - 279.31	ul O <sub>2</sub> /g wet wt./hr	NR	Tadpole	Lab	af	6
Time of Fledging or Metamorphosis	May - June				NR	Tadpole	CA	ag	1
Time of Mating/ Laying	Apr. - July				B	Adult	MT	ah	12
Time of Mating/ Laying	May - July				B	Adult	OR	ai	13
Time of Torpor or Hibernation	Sept. - May				NR	Adult	CO	aj	14

### Notes

- a N=20; Age="newly metamorphosed toadlets"; June; San Joaquin Valley; snout-vent length = 1.66 +/- 0.04 mm
- b N=50; East River Valley, Gothic, Gunnison county (elev., 3000 - 3355m)
- c mean and range of body weight; N=18; June-Sept.; Garfield County; snout-vent length range = 81 - 111 mm
- d mean and range of body weights; N=17; June-Sept.; Garfield County; snout-vent length range = 75-98 mm
- e N=NR; Age=one-yr or newly metamorphosed; Apr. - Sept.
- f N=76
- g N=84; Age=Gosner stage 20
- h N=25; Age=Gosner stage 46
- i N=42; Age=Gosner stage 26
- j N=39; Age=Gosner stage 32
- k N=39; Age=Gosner stage 30
- l N=26; Age=Gosner stage 40
- m N=26; Age=Gosner stage 37
- n N=26; Age=Gosner stage 35
- o N=NR; Lost Lake, Linn county
- p % occurrence in fecal pellets examined  
; N=320 fecal pellets/ 6 animals; May - July; residential lawn, Bakersfield [lat. 35°02'N; long. 119°09'W]; see citation for biomass estimates for prey items
- q % frequency of occurrence of prey items in stomach contents; N=7; June - Aug.; Northern Flathead Valley
- r % of stomachs containing prey items; N=33; July; Left-hand reservoir, Boulder county (elev., 10,638ft); see citation for complete listing of invertebrate families represented in diet
- s figure of biomass of food ingested by juvenile toads maintained at various temperatures; N=9-11 animals/group; Age=one-yr or newly metamorphosed
- t figure of weight increase in juvenile toads maintained at various temperatures; N=9-11 animals/group; Age=one-yr or newly metamorphosed
- u equation relating standard metabolic rate (SMR; cm<sup>3</sup> O<sub>2</sub>/g/hr), measured as oxygen consumption, to body temperature (T, 10-30C) on animals captured no more than a week before testing; N=30; captured at East River Valley, Gothic, Gunnison county (elev., 3000 - 3355m)
- v polynomial equation relating active metabolic rate (AMR; cm<sup>3</sup> O<sub>2</sub>/g/hr), measured as oxygen consumption, to body temperature (T, 10-30C) in animals captured no more than a week before testing; N=49; captured at East River Valley, Gothic, Gunnison county (elev., 3000 - 3355m)
- w figure of oxygen consumption measured at a series of temperatures; N=9-11 animals/group; Age=one-yr or newly metamorphosed
- x Cutaneous oxygen uptake at 5C; N=10
- y Pulmonary oxygen uptake at 15C; N=10
- z Pulmonary oxygen uptake at 5C; N=10
- aa Cutaneous oxygen uptake at 25C; N=8
- ab Pulmonary oxygen uptake at 25C; N=8
- ac Cutaneous oxygen uptake at 15C; N=10

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ad regression equation relating resting oxygen consumption (VO<sub>2</sub>; cm<sup>3</sup> O<sub>2</sub>/min) to log body weight (BW; g) at 25-27C; N=13; see citation for figures relating body weight to oxygen consumption  
ae regression equation relating active oxygen consumption (VO<sub>2</sub>; cm<sup>3</sup> O<sub>2</sub>/min) to log body weight (BW; g) at 25-27C; N=76; see citation for figures relating body weight to oxygen consumption  
af range of mean oxygen consumption rates for 11 tadpole stages; N=10-84/age group; Age=Gosner stages 20-46  
ag N=NR; San Joaquin Valley  
ah time of mating; N=NR; ponds, Missoula and Ravalli counties  
ai time of mating; N=NR; Deschutes and Linn counties (elev., 1220-1950m)  
aj time of hibernation; N=30; Boulder county (elev., 2,975m)

### References

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